

DAILY LIFE IN A MISSION

**NEED
TO
KNOW**

Teacher Information: Adobe Bricks

Background: Years ago people could not go to their favorite store and purchase items as we do now. Our ancestors had to make many of the items that we now purchase. Some men and women were very talented in producing an item or in performing a particular task. People would seek their wares or ask that an item be made for them. Barter was the normal practice, Making bricks for building was one task that had to be done correctly. If done incorrectly, a brick might dissolve in rain, or break and crumble when weight was placed upon it. The three primary building materials used in constructing the San Antonio missions were limestone, wood, and kiln-dried brick. Adobe brick, a sun-dried brick, was occasionally used. In fact, Native Americans had been using adobe for hundreds of years before the Spanish arrived in the Americas. Adobe was a very efficient building material. It was inexpensive and easy to make. Adobe is made primarily out of clay, soil, small pebbles and rocks, straw, grass, and sticks. One could compare adobe to concrete of today: The mud formed from clay and soil mixed with water forms the cement; the pebbles and rocks are like aggregate in concrete; and the straw, grass, and sticks are like the steel rebar. After the raw adobe mixture was made up, it was molded into bricks, which were left to harden in the hot sun for several days. They were then used, just like modern bricks, to construct buildings. The bricks were held together with an adobe mortar. In the missions, adobe bricks were used until kiln-dried brick could be made.

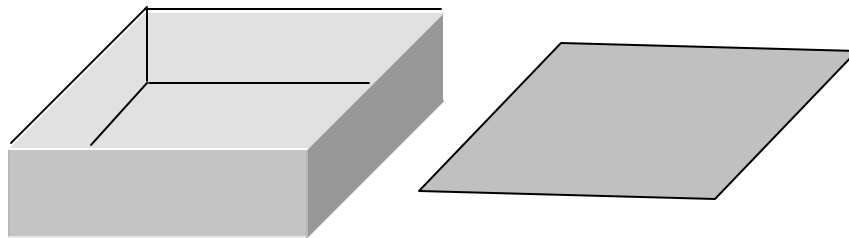
TEKS (Texas education standards)

- Gather information by observing and measuring.
- Construct simple graphs, tables, maps and charts to organize, examine, and evaluate information.
- Demonstrate safe practices during field and laboratory investigations.
- Make wise choices in the use and conservation of resources and the disposal or recycling of materials. Describe ways people have adapted to and modified their environment in Texas, past and present.
- Identify reasons why people have adapted to and modified their environment in Texas, past and present, such as the use of natural resources to meet basic needs.
- Analyze the consequences of human modification of the environment in Texas, past and present

Materials

- Book about the life of a Spanish Colonial child (available at the Visitor Center at Mission San José or possibly in the school library)
 - Spade per group
 - Trowel per group
 - 30-lb Clay (from garden or building supply companies)
 - 50-lb. bag of sand per class
 - Hay or dead grass clippings
 - Paint (white and primary colors)
 - Concrete-brick comparison chart (one for each group)
 - First Aid Kit (if the class is away from the school)
 - Camera (for once in a lifetime shots)
 - Brick Forms: (The trades department in your high school might help with the forms.)
1. Use four 1 pieces of 2" X 6" lumber.
 2. Construct 12" X 12" squares (internal dimensions). The forms will be 6" deep, approximately.
 3. Use ½" plywood (exterior grade) to make 12" X 12" temporary bottoms and tops.

Example of Brick Form



4. Make the same number of forms and bottoms as the number of adobe bricks that are desired, and three tops. Three tops will allow three students to fill and compress the adobe brick in all the forms.

Teaching Hints and Safety Precautions

- This activity can take several weeks from start to finish, due to the time it takes to dry and cure the bricks. Plan accordingly.
- Have students work in groups of three or four students: stompers/mixers, hay cutters, spaders/ measurers, and form fillers/ packers
- Old shorts, tee shirts, and no shoes are appropriate for this activity.
- Provide a garden hose and nozzle for water and clean up.
- Invite parents to help.

- Dig a pit approximately 3-ft wide by 4-ft long by 12-in deep. The pit should be without grass burrs or sharp objects.
- Use goggles when "stomping" the mud.
- Wear gloves when using the trowel and spade.
- Provide drinking water and shade on hot days.
- Have the student compile a list of "rules" for good behavior.

References

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Zappler, Georg. Learn about Texas Indians. Austin, Texas: Texas Parks and Wildlife Press. 1996.

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Martinello, Marian L. and Nesmith, Samuel P. With Domingo Leal in San Antonio, 1734. The University of Texas Institute of Texan Cultures. 1997.

Kalman, Bobbie and Nickles, Greg. Historic Communities: Spanish Missions. Crabtree Publishing Company, N.Y. 1997.

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Student Information: Constructing Adobe Bricks

Objective: You will be able to make adobe bricks using a method that is similar to the one used at Mission Espada.

Engagement

1. Listen as your teacher reads a book to you about the life of a Spanish Colonial child.
2. Discuss what would have amazed this child if he or she could come to visit you for a day. Consider: clothes, food, transportation, houses and recreation



Exploration

In this activity, you will be making adobe bricks similar to the ones used to construct the missions.

1. Read the following instructions on how to make adobe bricks. Determine the tasks and decide who in your group will do each.
2. Cut or break the hay into small lengths, approximately 6 to 10 inches in length.
3. Place three spade scoops of clay for every five spade scoops of sand in your mixing pit. Do this three times; do not overfill your pit.
4. To measure the hay, pick up a bundle that you can close your thumb and forefinger around. Add three bundles of hay to the contents of the pit.
5. Add water slowly and mix the contents thoroughly until you have a very thick paste of clay, mud and straw. Stomping with bare feet is one way to mix!
6. Place a square of plywood into the bottom of each brick form.
7. Using a spade, fill up the brick form with the clay mixture. Fill it to the top and use another square of plywood to press the mixture into the form.
8. Allow the bricks to dry for twenty-four hours or longer. (The time depends on the temperature and relative humidity.)
9. Lift the forms from around the bricks. Use a square of plywood to push on the brick if necessary. Be careful to keep from breaking your brick.

10. Carefully turn your brick over to dry on the other side for twenty-four hours or longer.
11. Store bricks in a dry area to cure (dry and harden) for three to four weeks.
12. When the bricks have cured, paint them with a first coat of white. Allow the coat to dry. Paint shapes or designs on the bricks with colored paints.
13. You are ready to find a place in a garden at school or home to use your adobe brick for decoration.

Explanation

- Complete the concrete-brick comparison chart to show the job of each ingredient of brick (as compared to concrete). Research the topic of concrete for more information or ask your teacher for help if necessary.
- Describe the characteristics of brick immediately after it has been mixed.
- Describe the characteristics after it has dried in the sun.

Elaboration

Visit Mission Espada. Mission Espada was the only mission where bricks were made. Your teacher will provide *A Kid's Guide to Mission Espada*. Review on page 8 how bricks were made. Visit the main gate and the church and answer the questions on page 8.



Evaluation

Pretend you are a reporter. Choose a period in the history of the missions. Write a newspaper article about some phase of construction at Mission Espada. Sources of information might be:

Timeline for the Missions

A Kid's Guide to Mission Espada

Information from your investigation about making adobe bricks

Information from your visit to Mission Espada

Sources available at the Visitor Center or your school library

Evaluation Criteria

40%

Your newspaper article included accurate and interesting material on some phase of construction at Mission Espada.

60%

You completed your share of the investigation as planned.

You answered all questions in the investigation and in the visit to the mission completely and accurately.

You recorded accurately the information on the charts.

Name: _____

Chart: Comparison of Brick and Concrete

Brick Ingredients	Comparable Concrete Ingredients